

S/14/23/SC

SCIENCE

Module D

EAST ANGLIAN EXAMINATIONS BOARD

SCIENCE—MODE 2

Tuesday 24 May 1983. (9.30 a.m.)

Candidate's Name Candidate's No.

TOPIC D—FORENSIC SCIENCE

(a) The following is a list of forensic methods of obtaining evidence.

- A Analysis by ultra violet fluorescence.
- B Paper chromatography.
- C Infra red photography.
- D Etching with acids.
- E Lie detection with a lie detector.
- F Examination by microscope.
- G Blood grouping.

Answer the questions by writing the **letter** (A, B, C, D, E, F or G) of the correct answer in the box provided. You may use the same letter for more than one answer.

(i) Which method does **not** provide evidence which is acceptable in a British court? ☐(ii) Which method could be used to identify fragments of glass? ☐(iii) Which method could be used to identify samples of ink from a forged document? ☐(iv) Which method can reveal filed away numbers on an engine block? ☐(v) Which method could be used to identify paint flakes from a stolen car? ☐(vi) Which method might prove that a man was **not** the father of an illegitimate child? ☐(vii) Which method relies on measuring the changes in the electrical resistance of the skin? ☐

[Turn over]

(b) Give **two** examples of evidence (clues) which police might look for at the scene of a burglary.

1st example

2nd example

(c) (i) Describe how you would compare the pH of two soil samples using Universal Indicator

(ii) State the colour of Universal Indicator when it has been put into the following solutions.

Strong acid

Strong alkali

(iii) A sample of clean sand was tested with Universal Indicator solution. The result showed the sand to be

A acid

B neutral

C alkali

(Answer A, B or C in the box provided.)

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(d) Read the following passage, then answer the questions from the information given.

Mrs. Williams, a rich widow, has been found brutally stabbed to death in her bedroom. As well as large amounts of blood, footprints were found on the bedroom carpet. The material in the footprints had a pH of 9 and the blood on the carpet was group A.

The three main suspects are, Bill, her gardener, Giles, her secret lover, and Gertrude, who is Giles' wife.

Bill often wore muddy wellington boots to dig the clay soil in Mrs. Williams' garden. Blood of group A was found on Bill's handkerchief, and also blood of the same group was found on a handkerchief belonging to Giles.

Gertrude is a keen gardener but she finds the clay soil in her garden difficult to dig. Giles hates gardening and works shifts at the local cement works. It is known that Giles was in the habit of visiting Mrs. Williams after his afternoon shift had ended at 10 p.m.

Gertrude has the same blood group as her husband which is the most common group in the British population. Mrs. Williams had group A blood, as does Bill.

In Giles' shed the police found a pair of muddy boots which Gertrude wears for gardening, and also a pair of dirty shoes which Giles wears when shovelling cement at work.

(i) Estimate the pH of the mud on Bill's wellington boots.

(ii) Estimate the pH of the dirt on Giles' shoes if it came from the floor of the cement works.

(iii) Which is the commonest blood group in the British population?

(iv) Which of the following is the most useful evidence in deciding who killed Mrs Williams?

(Answer A, B, C or D in the box provided.)

A The pH of the soil in Mrs. Williams' garden.

B The pH of the soil in Gertrude's garden.

C The blood on Bill's handkerchief.

D The blood on Giles' handkerchief.

(v) Which of the three suspects, on the basis of the evidence, is most likely to have killed Mrs. Williams?

Give **two** reasons for your answer.

1st reason

2nd reason

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